

Epidemiology of urethritis in Ibadan

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Ibadan is the largest West African city with a population of approximately 1·2 million. It is the capital of the Western State of Nigeria and the headquarters of the State Ministry of Health. The Northern and Western areas of the city are fairly well developed, whereas the Southern and Eastern parts of the city are poorly developed, overcrowded, and with poor sanitation.

Few accurate statistics are available as to the incidence and pattern of venereal diseases in Ibadan. In 1943 the incidence of gonorrhoea among Nigerian troops in Nigeria was reported to be 600 per 1,000 (Willcox, 1946). In 1945 the incidence of venereal diseases amongst African troops in Nigeria was 537 per 1,000 compared with 614 per 1,000 in Gambia, 325 per 1,000 in Sierra-Leone, and 491 in the Gold Coast (Willcox, 1956).

It is to be borne in mind that these rates are old wartime figures among troops on the move, but they indicate that a large proportion of the female population at that time were infected with venereal diseases.

Romanowski (1952) studied 827 men and women in Sokoto town in Northern Nigeria, mainly prostitutes, policemen, and prisoners. He found 165 cases of syphilis and 81 of gonorrhoea. The prevalence of gonococcal infection was about 97 per 1,000 in Sokoto.

The WHO Expert Committee on Gonococcal Infections published in 1963 figures of annual incidence of gonococcal infection in some cities during the year in 1960. In Lagos Federal Territory, it was 4907·6 per 100,000 adult population and in Jamaica 3847·2 per 100,000. These were the highest of a number of world figures quoted. Unfortunately no figures were given for the city of Ibadan, which is some 80 miles north of Lagos and larger than Lagos.

There are at present no comprehensive or reliable statistics as to the present situation of venereal diseases in Ibadan or even for the whole of Nigeria.

According to the Annual Report of the Public Health Department, in Ibadan in 1965, 410 cases of gonorrhoea were reported from the Government run hospitals. There are no venereal diseases clinics in Ibadan and the overcrowded Government Hospitals in the city are very busy treating other endemic conditions. Consequently the treatment of venereal diseases has been left to private practitioners, pharmacists, herbalists, and native doctors. The purpose of this presentation is to find out firstly, the frequency of the different aetiological agents causing urethritis among cases in the University College Hospital, Ibadan, secondly, the prevalence of gonococcal infection among housewives (representing the low-risk group) and prostitutes (representing high-risk group), and thirdly, the incidence of isolation of T-strain mycoplasmas in the urethra of patients with non-gonococcal urethritis (NGU) and a control group of Nigerian males.

Material

The following groups of patients were studied:

- (1) 442 men referred to the Endemic Diseases Clinic of University College Hospital, Ibadan, because of urethral discharge and/or irritation.
- (2) 228 women referred to the clinic because of heavy vaginal discharge or because they were consorts of male patients with symptoms.
- (3) 130 local urban indigenous illiterate healthy women between the ages of 15 years and 45 years. They were all housewives from polygamous homes carrying on petty trading.
- (4) Nineteen prostitutes resident in a local hotel.
- (5) 93 men diagnosed as cases of non-gonococcal urethritis (NGU).
- (6) 65 men aged between 15 and 45 years presenting at the General Out-patients Department of the hospital with no genito urinary symptoms or history of urethral discharge in the preceding 6 months. These men were used as controls for the NGU patients.

Methods

INVESTIGATIONS FOR GONORRHOEA

Men

Urethral specimens were collected and smears were stained by Gram's method for intracellular Gram-negative diplococci. Specimens were then plated at the bedside on Thayer-Martin medium (Thayer and Martin, 1964) and incubated immediately in a tin with a lighted candle. A wet preparation of the genital discharge was then examined for *Trichomonas vaginalis* and *Candida albicans*.

The gonococci isolated were identified by a positive oxidase test, and by fermentation reactions. The sensitivities of the isolated strains were tested by the Oxoid multidisk method against penicillin (1.5 units), tetracycline (10 µg.), streptomycin (10 µg.), and chloramphenicol (10 µg.).

Two-glass urine tests were also carried out.

Women

Urethral and cervical specimens were examined microscopically and by cultures as in the male cases. Additionally a high vaginal specimen was examined by wet smear for *Trichomonas vaginalis* and *Candida albicans*. In the cases of nineteen prostitutes, blood samples were taken for VDRL and FTA-200 tests.

All patients were questioned about their age, place and source of infection, symptoms, incubation period, marital status, occupation, and town of origin, as well as about previous diseases and antibiotics taken.

INVESTIGATIONS FOR MYCOPLASMAS

Cultures for large colony mycoplasmas and T-strain mycoplasmas were carried out on 93 male patients diagnosed as cases of NGU on the following results: Negative results to smears and cultures for gonococci, a positive two-glass test, and more than ten pus cells per high-power field of urethral smear.

Urethral specimens were also taken from the 65 male control cases.

In all cases, urethral specimens were collected on sterile cotton-wool swabs and plated on:

(a) *Solid Medium I* (Mycoplasma Reference Laboratory*), i.e. Human serum agar. This supports the growth of most mycoplasmas.

(b) *Solid Medium II* (for T-strain mycoplasmas) plus 1 per cent. urea with phenol red indicator.

(c) *Liquid Medium III* Enrichment broth for T-strain mycoplasmas with urea and phenol red.

The swabs were broken off into a bijou bottle containing this medium after plating on solid media. Enrichment broths were examined twice daily for colour change. Subcultures to solid medium were carried out as soon as possible after colour change. Enrichment broths showing no colour change were plated on solid media after 48 hours incubation.

Culture plates were incubated in an atmosphere of 95 per cent. nitrogen and 5 per cent. CO₂ at 37°C. Enrichment broths were incubated in screw-cap bijou bottles at room temperature of 35–37°C. in air. Culture plates were examined at 48, 72, and 96 hours, using a plate microscope.

Mycoplasmas were identified by characteristic colonial morphology after staining with alcoholic methylene blue Dienes's stain. (Dienes, 1939). The strains isolated were further identified by the growth inhibition test, using mycoplasma hyperimmune rabbit serum obtained from Microbiological Associates, Bethesda, Maryland (Stanbridge and Hayflick, 1967; Clyde, 1964).

T-strain mycoplasmas were identified by:

(a) Typical colonial morphology on solid medium and characteristic features on staining with Dienes's stain (Shepard, 1967).

(b) Urease activity shown by changing the colour of the indicator in urea broth (Shepard and Lunceford, 1967).

(c) Failure to increase in size with incubation beyond 48 hours.

Results

Table I shows the age distribution of cases in the series, 69 per cent. of males and 62 per cent. of females being over 25 years of age; 4 per cent. of the males and 7 per cent. of the females were in the age group 15 to 19 years.

TABLE I Age distribution of cases investigated (442 males and 228 females)

Age (yrs)	Males (442)		Females (228)	
	No.	Per cent.	No.	Per cent.
2-10	0		10	4
15-19	17	4	15	7
20-24	119	27	62	27
25 and Above	306	69	141	62

In this series a higher percentage of men suffered from NGU (61 per cent.) than from gonorrhoea (33 per cent.), while in women gonococci were found in only 17 per cent. of cases investigated (Table II).

TABLE II Infections diagnosed in males and females

Diagnosis	Males (442)		Females (228)	
	No.	Per cent.	No.	Per cent.
Gonorrhoea	147	33	38	17
<i>Trichomonas vaginalis</i>	15	4	44	19
<i>Candida albicans</i>	9	2	63	23
Non-gonococcal urethritis	271	61		—
No abnormalities	0	0	83	36

Table III shows that 47.1 and 21 per cent. of the men were infected by casual consorts and prostitutes respectively, while 20.4 per cent. were infected by their wives.

*See Appendix

Among the females only 11.4 per cent. were infected by casual consorts whereas 63.1 per cent. were infected by their husbands.

TABLE III *Sexual partners in 670 cases*

Sexual partner	Males		Females		Total
	No.	Per cent.	No.	Per cent.	
Marital	90	20.4	144	63.1	234
Regular	51	11.5	48	21.1	99
Casual	208	47.1	26	11.4	234
Prostitute	93	21.0	0	0	93
Unknown	0	0	10	4.4	10
Total	442		228		670

Table IV shows the sources of infection of married men compared to those of single men.

48 per cent. of both married and single men were infected by casual consorts; 30 per cent. of single men and 14 per cent. of married men were infected by prostitutes.

TABLE IV *Sexual habits of married and single men*

Source of infection	Married men		Single men	
	No.	Per cent.	No.	Per cent.
Marital	89	34	0	0
Regular consort	11	4	39	22
Casual	124	48	87	48
Prostitute	37	14	55	30
Total	261		181	

Table V compares the incidence of mycoplasmas in 93 men diagnosed as having NGU and in 65 normal Nigerian males with no genitourinary symptoms or history of urethral discharge in the preceding 6 months. T-strain mycoplasmas were isolated from eighteen (19.3 per cent.) of the 93 patients with NGU, and from thirteen (20 per cent.) of the 65 controls.

TABLE V *Incidence of mycoplasmas in male patients with NGU and controls*

Group		NGU (93)		Controls (65)	
		No.	Per cent.	No.	Per cent.
Mycoplasma isolated	T-strain	12	12.9	3	4.6
	M-hominis	2	2.1	4	6.1
	Both	6	6.4	10	15.4

Table VI shows the result of examinations of 130 local urban women aged 15 to 45 years with no urogenital symptoms.

The incidence of gonococcal infection in this group of women is 5 per cent. compared with 17 per cent. in hospital patients.

TABLE VI *Findings in 130 symptomless local women*

Diagnosis	No.	Per cent.
<i>Trichomonas vaginalis</i>	19	15
<i>Candida albicans</i>	15	12
Gonorrhoea	7	5
Nil	89	68
Total	130	100

Of the 130 women, thirteen (10 per cent.) reported that their husbands had had urethral discharge in the last 2 years. The diagnoses in these thirteen women were as follows: three had trichomonal vaginitis, two had candidosis, and gonococci were present in two; in the remaining six nothing abnormal was found.

Table VII shows the results of a survey of 19 prostitutes at one of the local hotels in Ibadan. Three had gonorrhoea and three had trichomonal vaginitis. None had candidosis and in thirteen nothing abnormal was found.

TABLE VII *Findings in nineteen prostitutes*

Diagnosis	No. of cases
Gonorrhoea	3
<i>Trichomonas vaginalis</i>	3
<i>Candida albicans</i>	0
Nil	13
Total	19

The three strains of *N. gonorrhoeae* isolated were found to be resistant to 1.5 units of penicillin by the multidisc method. Three women had positive VDRL and FTA-200 tests.

Discussion

Table II shows that 271 (61 per cent.) of males suffered from NGU while only 147 (33 per cent.) had gonorrhoea. This higher incidence of NGU is probably due to the fact that self-treatment may have been used and that cases of urethral discharge not responding to penicillin therapy were more frequently referred to the clinic by general practitioners.

Among the women 38 (17 per cent.) had gonorrhoea, while in 83 cases (36 per cent.) no pathogenic organisms were found. The reason for the high number of non-infected women is that some of the men had more than one wife or consort, most

of whom were persuaded to come for examination. One of the men with gonorrhoea had six wives but only one of them was harbouring *N. gonorrhoeae*.

The frequent occurrence of strains of gonococci with a high degree of partial resistance to penicillin (*i.e.* 19 (10.3 per cent.)) is to be expected because of the widespread and indiscriminate use of antibiotics by the public, penicillin and other antibiotics being freely available from chemists and pharmacists in the city.

In this study, 301 (68 per cent.) of the men contracted their infection from casual friends and prostitutes, as opposed to 11 per cent. of cases in women (Table III). In 84 per cent. of women intercourse was part of a stable relationship either marital or with a regular male consort. It should be observed that no case of homosexually acquired infection was encountered. 78 per cent. of the single men were infected through casual sexual relationships as opposed to 62 per cent. of the married men (Table IV). Extramarital exposure to risk of infection by prostitutes and 'pick-ups' among married men plays an important part in the transmission of infection; this is probably due to the custom whereby married men abstain from sexual relationships with their wives from early pregnancy until 1 to 2 years after delivery.

In ten cases of gonococcal vulvo-vaginitis in girls under the age of 10 years, the source of infection could not be identified. The mothers and maid-servants in the households were examined, but it was difficult to get the fathers and other men to submit to examination. There was no history or physical evidence of sexual assault in any of these girls. It is believed by some uneducated members of the community that sexual intercourse with a virgin will cure urethral discharge, but no such case was encountered in this series.

The relatively small number of prostitutes included in this study is partly due to the fact that it was very difficult to persuade the girls to undergo medical examination for fear of consequent police action. These girls spent most of the day sleeping after their nocturnal exertions.

The prevalence of gonococcal infection among the prostitutes was 15.8 per cent. (3 out of 19) compared with 5 per cent. and 17 per cent. among indigenous symptomless women and female hospital patients respectively. These findings indicate that there is a considerable reservoir of infection among the female population in Ibadan.

Casual consorts were responsible for infecting 47.1 per cent. of male patients whereas the prostitutes infected only 21 per cent. It seems, therefore, that in Ibadan casual and promiscuous girls play the

major part in the spread of venereal diseases. All the prostitutes investigated were aware of the high risk of contracting venereal diseases and all took prophylactic antibiotics, either as a twice-weekly injection of penicillin from a chemist or as tetracycline capsules, up to 750 mg. daily in some cases. It is therefore not surprising that only three of the nineteen prostitutes had gonorrhoea and that these three strains of gonococci were resistant to 1.5 units penicillin by the multidisc method. Similarly, many of the men in the city purchase three or four capsules of tetracycline from the local chemist when they recognize the acute symptoms of gonorrhoea. This may relieve the symptoms but does not usually cure the infection and this of course increases the likelihood that partially resistant strains of gonococci will develop and persist.

There has been a considerable controversy as to the role of T-strain mycoplasmas in cases of NGU (Fowler and Leeming, 1969).

Shepard (1956, 1959) first recovered T-strain mycoplasmas from urethral scrapings in cases of NGU, and found that this organism was present in some 70 per cent. of cases.

Earlier, Shepard (1954) had recovered PPLO from the urethrae of twenty (53 per cent.) of 38 male Negro Clinic patients with NGU compared with nineteen (33 per cent.) of 57 normal male Negro students.

In the present study, the isolation rates of T-strain mycoplasmas in NGU patients and controls were 19.3 and 20 per cent., respectively, while those of *M. hominis* were 8.5 per cent. and 21.5 per cent.

Table V suggests that the rates of incidence of *M. hominis* and T-strain mycoplasmas are much lower in Nigerian males than in American Negroes, although there is a similar high sexual exposure rate amongst Nigerian males, but in Ibadan free access to broad-spectrum antibiotics may be an important factor.

There was no statistically significant difference between patients and controls as regards the frequency of the isolation of T-strain mycoplasmas ($\chi^2 = 0.112$; $P > 0.7$), and it appears that this organism is unlikely to be the cause of NGU in Nigerian men.

Summary

442 men and 228 women referred to the Endemic Diseases Clinic of University College Hospital, Ibadan, were investigated for sexually transmitted urogenital infections, together with 130 symptomless women from the local urban population and nineteen prostitutes.

Outstanding findings were the predominance in

men of non-gonococcal urethritis (NGU) (61 per cent. of infections) compared with gonorrhoea (33 per cent.), though the examination of 130 women in the local population revealed a very substantial reservoir of asymptomatic gonorrhoea (5 per cent.). A likely reason for these patterns of infection is that self-treatment of symptomatic disease is widely practised, broad spectrum antibiotics being freely available. Of the prostitutes examined, all took prophylactic treatment regularly, and only three had gonorrhoea, all due to organisms with marked partial resistance to penicillin.

93 men with NGU and 65 healthy men examined as controls were investigated for mycoplasmas. T-strain mycoplasmas were cultured in 19 per cent. of the cases of NGU and in 20 per cent. of the controls; isolation rates for *M. hominis* were 8.5 and 21.5 per cent. respectively.

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Epidémiologie des urétrites à Ibadan

SOMMAIRE

On rechercha les infections uro-génitales d'origine vénérienne chez 442 hommes et 228 femmes consultant la Clinique des Maladies Endémiques à l'University College Hospital d'Ibadan, ainsi que chez 130 femmes de

la population urbaine locale ne présentant aucun symptôme et que chez 19 prostituées.

Les résultats les plus marquants furent la prédominance, chez les hommes, d'urétrite non gonococcique (UNG) (61% des malades), par rapport à la gonococcie (33%), quoique l'examen de 130 femmes de la population locale ait révélé qu'il existait un réservoir très important de gonococcie asymptomatique (5%). Une raison probable à cette situation est, qu'en cas de manifestations cliniques apparentes, les auto-traitements sont largement pratiqués, avec des antibiotiques à large spectre que l'on peut se procurer librement. Toutes les prostituées examinées prenaient un traitement prophylactique régulier et trois seulement présentaient une gonococcie due, dans ces trois cas, à des germes ayant une résistance partielle nette vis-à-vis de la pénicilline.

On rechercha les mycoplasmes chez 93 hommes atteints d'UNG et chez 65 hommes sains pris comme témoins. Des mycoplasmes de la souche T furent obtenus par culture chez 19% des UNG et chez 20% des contrôles. Pour *M. hominis*, les pourcentages d'isolement furent, respectivement, de 8,5 et de 21,5%.

APPENDIX

MEDIUM I (MYCOPLASMA REFERENCE LABORATORY)

Bacto PPLO agar	70 ml.
Human serum	10 ml.
Yeast extract	10 ml.
Boiled blood extract 1	10 ml.
DNA (0.2 per cent.)	1.0 ml.
Thallous acetate (1 per cent.)	2.5 ml.
Penicillin (100,000 units/ml.)	0.2 ml.

MEDIUM II (MYCOPLASMA REFERENCE LABORATORY)

Oxoid tryptose soya broth	30 g.
Oxoid tonager No. 2	12.5 g.
Deionized water	1 litre

Before use add:

Horse serum	20 per cent.
Penicillin	200 u./ml.
Thallium acetate	1/10,000 w/v
pH adjusted to 6.8	
Urea	1 per cent.
Phenol red	(Final concentration of 0.004 per cent.)

MEDIUM III (ENRICHMENT BROTH)

T-strain broth	(MRL—prepared as Medium II less Agar)
*Urea	1 per cent.
Phenol red indicator	(Final concentration 0.004 per cent.)

*Urea added aseptically to media using sterile 40 per cent. stock solution.